**Algebra 2 Trig.** **Chapter 3 Review** **Name** Key

**Solve each of the following.**

1) $7^{2x-1} = 7^{5x}$

exponents: $2x-1 = 5x$, $\frac{-1}{3} = \frac{3x}{3}$

x = $-1/3$ or $-0.\overline{3}$

2) $3^{2x+7} = 27^{x}$

$3^{2x+7} = (3^3)^x$ | exchange base

$3^{2x+7} = 3^{3x}$ | simplify exponents

$2x+7 = 3x$

$7 = x$

x = 7

3) $(x^{\frac{1}{5}})^5 = 2^5$

$x^1 = 2^5$

$x = 32$

| multiply exponents by 5 to make it 1

x = 32

**Simplify so there are no negative exponents.**

4) $\frac{18x^8y}{10x^2y^5}$

$\frac{18}{10} \cdot \frac{x^8}{x^2} \cdot \frac{y}{y^5}$

$\frac{9}{5} \cdot x^6 \cdot \frac{1}{y^4}$

$\frac{9x^6}{5y^4}$

5) $(8x^4y^3)(-3x^{-7})$

$8 \cdot (-3) \cdot x^4 \cdot x^{-7} \cdot y^3$

$-24x^{-3}y^3 = \frac{-24y^3}{x^3}$

6) $\frac{10x^2y^5}{2x^{-3}}$

$\frac{10}{2} \cdot \frac{x^2}{x^{-3}} \cdot y^5$

$5 \cdot x^5 \cdot y^5$

$5x^5y^5$

**Write an equivalent expression without negative exponents.**

7) $10x^3y^{-4}$

$10 \cdot x^3 \cdot \frac{1}{y^4} = \frac{10x^3}{y^4}$

8) $\frac{12x}{y^{-3}}$

$12 \cdot x \cdot \frac{1}{y^{-3}}$

$12 \cdot x \cdot \frac{y^3}{1} = 12xy^3$

9) $7^{-2}$

$\frac{1}{7^2} = \frac{1}{49}$

**Find an exponential function in the form $y = a(b^x)$ that satisfies the following conditions.**

10) Has an initial value of 7 and a multiplier of 6. a=7, b=6

$y = 7(6)^x$

11) Passes through the points (0, 2) and (2, 98).

| x | y |
|---|---|
| 0 | 2 |
| 1 | |
| 2 | 98 |

$\sqrt{b^2} = \sqrt{49}$, $b = 7$, $b^2$, $\times 49$

$y = 2(7)^x$

12) Passes through the points (1, 12) and (4, 324).

| x | y |
|---|---|
| 0 | 4 |
| 1 | 12 |
| 2 | |
| 3 | |
| 4 | 324 |

$\div 3$, $b^3$, $\times 27$

$\sqrt[3]{b^3} = \sqrt[3]{27}$, $b = 3$

$y = 4(3)^x$

**Solve each system of equations to find the point of intersection.**

13) elimination

$3(-2x - 6y = 0)$

$2(3x + 11y = 4)$

$-6x - 18y = 0$

$6x + 22y = 8$

$0 \quad 4y = 8$

$\frac{4y}{4} = \frac{8}{4}$

$y = 2$

$3x + 11(2) = 4$

$3x + 22 = 4$

$3x = -18$

combine

$x = -6$

(-6, 2)

14) substitution

$y = -2x + 9$

$3x - 4y = 8$

$3x - 4(-2x + 9) = 8$

$3x + 8x - 36 = 8$

$11x = 44$

$x = 4$

$y = -2(4) + 9 = -8 + 9$

(4, 1)

15) elimination

$2(-7x + 5y = 0)$

$14x - 8y = 2$

$-14x + 10y = 0$ combine

$0 + 2y = 2$

$\frac{2y}{2} = \frac{2}{2}$

$y = 1$

$14x - 8(1) = 2$

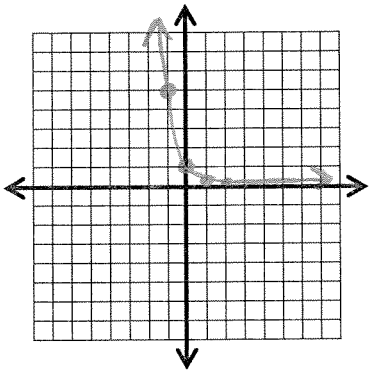
$14x - 8 = 2$ in

$x = \frac{10}{14}$

**Make a table and graph the following.**

16. $y = \left(\frac{1}{5}\right)^x$

*can't go below y=0!

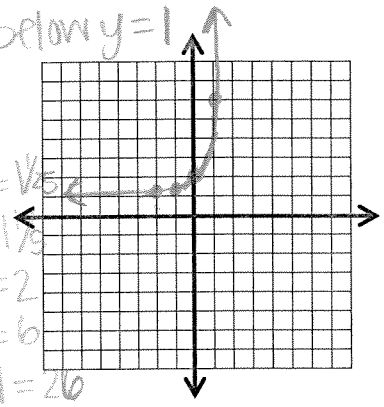


| x | y |
|---|---|
| -2 | 25 |
| -1 | 5 |
| 0 | 1 |
| 1 | 1/5 |
| 2 | 1/25 |

17. $y = (5)^x + 1$

can't go below y=1

| x | y |
|---|---|
| -2 | 1/25+1=1 1/25 |
| -1 | 1/5+1=1 1/5 |
| 0 | 1+1=2 |
| 1 | 5+1=6 |
| 2 | 25+1=26 |



**Applications**

a

18) **A car is purchased for $26,000 and decreases in value at the rate of 21% per year.** b = 100% − 21% = 79%, b = .79

a) What is the value of the car after **5 years**?

$y = 26000(0.79)^5$

$8000.34

b) What is the value of the car after **11 years**?

$y = 26000(0.79)^{11}$

$1944.78

c) Write an equation to express the value of the car after **x years**.

$y = 26000(0.79)^x$

**Write a system of equations to represent the situation and solve the problem.**

19. A garden store has two types of trees left.

M (16) B (44)

Maple trees sell for $62.50 and birch trees sell for $44.25. Inventory lists 60 trees at a value of $2947.

**How many maple trees are available? How many birch trees are available?**

$M + B = 60 \rightarrow B = 60 - M$

$62.5M + 44.25B = 2947$

substitute $62.5M + 44.25(60 - M) = 2947$

$62.5M + 2655 - 44.25M = 2947$

$18.25M + 2655 = 2947$

$18.25M = 292$

$\frac{18.25M}{18.25} = \frac{292}{18.25}$

$M = 16$

$B = 60 - 16 = 44$

20. There were 1200 people at the football game on Friday night.

# A (180) # S (720)

Adults pay $5 and students pay $3. There was $4560 taken at the gate

**How many adults were at the game? How many students were at the game?**

$-3(A + S = 1200)$ elimination

$5A + 3S = 4560$

$-3A - 3S = -3600$

$2A = 960$

$A = 480$ adults

$A + S = 1200$

$480 + S = 1200$

$S = 1200 - 480$

$S = 720$ students